EXHIBIT 19
[FILED UNDER SEAL]

Notes at go/drx-drs-notes

Meeting: DRS Sync
Date: 3/19/17
Agenda
- Experiment result
- Launch review feedback

Notes
- Launch review feedback (rasta 1, rasta 2)
    - Sellside launch review + Quality Ads
        - Approvals for both pending modeling review feedback
            - Nirmal's biggest concern here is if we can get full rev share back
                - Plan to use throttling pipeline from DRS v2
                - Shouldn't show much of impact right now but will be a good safety valve
    - 2 launch candidates - could recoup from rpo + 2nd bid or just rpo
        - 2nd bid + rpo showed better results from Google profit perspective, but gTrade favored just rpo b/c of interaction effects with Bernanke
        - Will launch just RPO version
            - ▇▇▇ raise in revenue
            - Google profit loss ▇▇▇
                - Throttling pipeline might help with this
                - Anticipate profit loss will shrink as we ramp up
        - Will launch in tandem with Bernanke based on experiments rather than simulation
- ▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇
    - Request needs ariane approval
- Standalone server (quota server) as opposed to per server count would be a more robust mechanism for bank account debt recollection (would lose less margin)

Meeting: DRS Sync
Date: 1/8/17
Agenda
- Buy-side review
- Rule floor in the RTB callout
- Debt account increase
- Q4 / Q1 OKRs

Notes
- Buy-side review
    - ▇▇▇▇▇ Nirmal
    - Goal: get buy in for launch approval
- Training pipeline for Bernanke is off in terms of reading sellside rev share (▇▇▇
▇▇▇▇▇▇▇▇▇
    - ▇ ▇▇▇▇▇▇▇▇▇▇▇▇▇

- ○ ▮ has proposed change
- RTB callouts
  - ○ 2 floors
    - ■ Floor for everyone
    - ■ Advertiser / agency specific floors
  - ○ Concerns
    - ■ Experiment shows ▮ revenue lift
      - Could be because they misinterpret buyer floor
      - Could be because bid falls into dynamic region
      - Plan to experiment with tDRS + no per buyer floor to see combined effect
- Plan to apply tDRS to all buying sources
  - ○ We know buyers ▮ are shifting spend away from AdX because of DRS v2
- Debt account increase
  - ○ Much higher debt pool in coordinated Bernanke tDRS experiment
  - ○ Need to debug
- OKRs
  - ○ Grade Q4 OKR:
    - ■ **Redacted - Privilege**
    - ■ Negative revshare DRS
      - Need to push this through launch review
      - ▮ score
    - ■ Launch tDRS to 15%
      - Currently at 5%
      - ▮ score
  - ○ Q1: get to 100%
    - ■ Continue to work on model improvements
      - Brainstorm ideas for how to improve model

Meeting: DRS Sync
Date: 12/11/17
Agenda
- tDRS + EB
Notes
- Concerns for applying tDRS to EB buyers
  - ○ Different exchanges will see different thresholds - EB buyers expect to see same floor as other exchanges on EB
    - ■ More of a risk that agencies could realize that floors are different across exchange bidding buyers
  - ○ Want to make sure no one clears below the floors

- o We don't have RPO applied to EB - can't make up debt
- o Transparency
  - ■ Mostly an issue of optics and perceptions
- o Need to investigate whether current help center language allows us to apply tDRS to EB buyers
- o Hard to justify rev share on AdX w/ same optimizations applied across both AdX and EB
- Decision
  - o Hold off on deciding whether or not to apply tDRS to EB
  - o Ramp up tDRS to 25% this week
  - o Continue trying to improve model performance over the next 1-2 months
  - o Launch tDRS to 100% in mid Q1

Meeting: DRS Sync
Date: 12/04/17
Agenda

- AdWords Bernanke adaption kicks in as expected. AdX buyers about the same, DBM buyers increase bit.
- Will meet with gTrade to decide on 25%.
- Resources utilization at ~10% now and should have enough room for ramping up to 25% from 5%.
- Dashboard -
- Jedi cap on recollection temporarily for bid data. Shooting for experiment this week.
- DBM whitelist change will be done this week.
- tDRS buyer whitelist should be updated regularly.

Meeting: DRS Sync
Date: 11/20/17
Agenda

- Coordinated experiments
- [Holdback model performance]

Action Items

- ▓▓▓▓: Schedule launch review before we go to 25%

Notes

- [Holdback model performance]
  - o Adwords only bids below 3p min, not publisher floors
    - ■ They don't want to forward all bids because of machine resources
  - o Theory: holdback model performance is outperforming base model b/c Adwords filters bids below publisher floors
    - ■ Always dropping rev share gives us better training data
- Coordinated experiments
  - o Wanted to start coordinated experiment last Friday but realized that we should probably link to holdback model

- - Adwords only wants to run 1 coordinated experiment b/c of profit hit that comes w/ custom Bernanke pool
      - Decided to bet on holdback model
    - Will require 7 days of training data (starting today)
  - Holdback model at 1% is now underperforming base model after 3 days
    - Wish we could test both in parallel
- Future of tDRS if GDN moves to Jedi
  - No meaningful floors that apply to Jedi right now
  - Plan is for GDN to move 1-2 quarters after Facebook joins
    - Will do experiments to make sure this is good for them
  - First price auction w/ 5% rev share for DSPs, 10% for networks
    - Smaller rev share means that tDRS will be less relevant
  - ▇▇▇▇▇▇▇ GDN will want to know 2nd highest bid in 1p auction
  - We're trying to make floor prices consistent across buyers in UI, might not be able to do RPO w/ different prices across buyers for Jedi
  - Hard constraint for Jedi: we can't advantage AdX buyers relative to Jedi buyers
  - Jedi should not just be fair, it should seem to be fair
  - ▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇
    - ▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇
      - Not clear that we will be able to do DRS in this world
- ▇▇▇▇▇: Schedule launch review before we go to 25%

Meeting: DRS Sync
Date: 11/14/17
Agenda
- tDRS on the holdback predictive model
- Coordinated Bernanke evaluation

Action Items
- ▇▇▇▇▇: file bug for tDRS testing on bank accounts

Notes
- tDRS on the holdback predictive model
  - 0.1% experiment on 0.1% holdback data
  - Initial results look encouraging (better revenue performance than model trained on 10% of data)
- Coordinated Bernanke evaluation
  - gTrade started training
  - Then we should be able to start an experiment w/ custom Bernanke pool
  - Need to try to get experiment out this week to avoid experiment freeze for Thanksgiving
- Infrastructure
  - Debug logs would be nice to have for tDRS (need to coordinate this with release cycles)
- Other launches that depend on tDRS launch
  - DBM is currently exempted from DRS

- - ■ Can't recoup debt from DBM for launches ███████████
  - ○ One benefit of tDRS is shared mechanism across buyers, which makes future launches easier (no asymmetry)
- Probably don't need buyside throttling for now
  - ○ Implication is that some buyers might be able to game this to have lower Google rev shares on their impressions
- Could add more testing for tDRS for bank accounts
  - ○ ██████ : file bug for tDRS testing on bank accounts
- Switched DBM DRS exemption to use AdX source type
  - ○ Looks like they are not getting lift from DRS v2 now
  - ○ We can turn off whitelist now

Meeting: DRS Sync
Date: 10/30/17
Agenda
- tDRS experiment with model trained on slice traffic
- Disable DBM buyers completely for DRS v2
- DRS v2 opt-out alerts
- Change to logging sellside rev share

Action Items
- ██████ : Look at why both tDRS experiments seem to be doing worse than DRS v2

Notes
- tDRS experiment with model trained on (0.1%) slice traffic
  - ○ Compared with model trained on 10% of traffic (100% is too much traffic for system to handle)
  - ○ Compared with DRS v2
- Even when we remove Adwords and train model on remaining buyers, we don't see model performance improve for other buyers
  - ○ Two effects:
    - ■ Model overweights to Adwords impressions when they're present
    - ■ Adwords impressions provide training examples
- Disable DBM buyers completely for DRS v2
  - ○ ██████ just approved, should approve today
- Custom Bernanke pool
  - ○ Waiting on ███ to approve
- DRS v2 opt out alerts
  - ○ Reenabled alerts today
  - ○ Only compute lift on AdX RTBs now; confidence interval seems much better
  - ○ Verified that alerts wouldn't have fired for last few days

Meeting: DRS Sync
Date: 10/23/17
Agenda
- tDRS experiment with model trained on slice traffic

- Disable DBM buyers completely for DRS v2
- DRS v2 opt-out alerts

Notes
- tDRS experiment with model trained on small slice of traffic
  - Wait a few days before looking at results
- Disable DBM buyers completely for DRS v2
  - Waiting on a couple more approvals
- DRS v2 opt-out alerts
  - Plan to remove adwords and dbm from calculations
  - We'll disable for a week to reduce spam until update is done
- Change to logging sellside rev share
  - Goal is to allow Bernanke to train knowing sellside rev share
  - More complicated than we thought it would be
  - Some reports are relying on current behavior
  - Reach out to ███████████
  - Logic to change sellside rev share will be submitted next week
- Issue with model
  - Model is over optimizing for Adwords
  - We could cross all features w/ ad source type to essentially train different models for adwords, dbm, and 3rd party buyers
- Staleness alerts for tDRS model
  - ████ is following up on this
- Fixed training to use applied rev share for DBM and Adwords, rather than just flat 20%

Meeting: DRS Sync
Date: 10/16/17
Agenda
- buy-sell revshare split
- tDRS on 0.1% training
- tDRS training for Bernanke-eligible queries
- asymmetric options
- DRS v2 active DBM buyers
- Opt-out alerts

Notes
- Rita is submitting a CL today to log buyside and sellside rev shares separately
  - ████████████████████████████
  - ████████████████████████████████
    ████████████
    - Will need logs launch ticket
    - We can specify that we only need to store this for a short period of time in proto (since this is only used for GDN training)
    - Making update to QEM and QSEM (only slightly exceeds threshold for QSEM)
- We create new version of tDRS model every couple of hours

- ○ Planning to set up alerts if it's been more than a day since we pushed a model
- ○ Alerts will go to xfp-optimization
  - We are not really serving on call though, typically less of an SLA for xfp-optimization
- 0.1% training
  - ○ █ added experiment id to query sample pipeline
  - ○ Small issue with data b/c we were sampling 0.1% training data at 10%
  - ○ Working on update now
- tDRS training for Bernanke-eligible queries
  - ○ Currently we log pre-buyside rev share for GDN
  - ○ Need to make update to use post-buyside rev share for GDN
  - ○ Will need to start up a custom Bernanke pool to measure effect
  - ○ Making this change should help increase impact of tDRS
- Asymmetric options
  - ○

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  - ○ Still need to consider product / technical perspective
- DRS v2 being applied to some DBM buyers, need to correct
- Alerts on opt out, saying that we aren't enforcing opt out
  - ○ Should fix denominator in metrics to be AdX RTB buyers on AdX pubs
  - ○ Need to debug opt out alerts

Meeting: DRS Sync
Date: 10/9/17
Agenda
- buy-side eval: custom bernanke
- asymmetric options
- tDRS model training on 1% traffic
- DRS v2 active on DBM buyers

Notes
- Discovered debt recouping bug when bernanke is in effect
  - ○ Pub payout should be more on these queries, shouldn't affect revenue
- Bernanke training has no information on sellside rev share
  - █ ████████████████████████████████████
  - █ ████████████████████████████████████
  - ████
- Rita set up experiment to collect training data for Bernanke for tDRS; have enough data now
- Asymmetric options
  - ○ ████████████████████████████████████
  - ████████ (rasta)

- ■ ████████████████████████████████████
  ██████
- ● ██
  ████████████████████████
- Important for buyers to know minimum price to win -- hard to do in non-truthful version of DRS
- tDRS model training on 0.1% traffic
  - Would like to look at
    - Profit loss on 0.1% of traffic from always dropping rev share
    - Revenue difference of tDRS when only training on 0.1% of traffic
    - Plan to run experiment to see
  - Consider whether we want to ramp up holdback experiment to 1%

Meeting: DRS Sync
Date: 10/2/17
Agenda
- custom Bernanke
- candidates performance
- asymmetric options

Action Items
- ██████ set up customer Bernanke pool for tDRS

Notes
- Custom Bernanke
  - gTrade wants to know about effects after we launch - best way to do this is with custom Bernanke pool
  - gTrade doesn't think Poirot should be an issue for tDRS
  - Plan to run coordinated experiment with gTrade experiment
    - ██
      ████████████████
      - Could do this for 1 - 2 days (7 would be ideal)
    - Tim will bring up model training job pointed to this 0.1%
    - Then, we will start up a new experiment where GDN applies Bernanke trained from step above
    - Publisher debt recollection won't matter as much for this experiment
      - Primarily looking for buyside profit to be neutral to positive
      - Plan to not do debt recollection on this slice
  - What kind of result are we expecting for tDRS on Adwords?
    - Bernanke is subject to constraint that they need to hit on 15% margin on average
    - We have the ability to do dynamic rev share on remaining 20%
- Candidates performance
  - Looked at performance of DRS v2 w/o buyside debt recollection + performance of tDRS in comparison

- ■ ████████████████████████████████
  - ████████████████
  - ○ Ramped experiment up to 5%
    - ■ ████████████████████
    - ■ Worried that revenue might go down once we start custom bernanke pool
- Per publisher analysis
  - ○ Top 1000 publishers, look at total revenue across exchanges
    - ■ ████████████████████████
    - ■ ████████████████████████
- ██ wrote a plx script to measure tDRS accuracy in serving
  - ○ ████████████████████████

Meeting: DRS Sync
Date: 9/25/17
Agenda
- discuss our readiness for ramping up tDRS
  - ○ pending resource approval
  - ○ model server deployment
  - ○ legal opinions in candidates
  - ○ model training on experiment slice only

Action Items
- ████████ : follow up with Tim on asymmetric treatments
- ████████ : turn on recouping and ramp up to 1%

Notes
- Current status recap
  - ○ 1% experiment for debt recouping
  - ○ Just received resources for ramp up to 25% for Sybil model
- ██████████████
  - ■ ██
    - ■ ██████████████
    - ■ ██████████████████████████
    - ■ ████████████████████████
  - ■ ██████████████████████████
  - ■ ██████████████████████████████
- We could potentially take from GDN second bid for debt recoupment
- Started experiment for tDRS enabled for just AdX RTB buyers
  - ■ ██████████████████████████████████████
  - ■ ████████ turn on recouping and ramp up to 1%
- Would like to move to tDRS world for all buyers to remove first pricing effect
  - ○ Need to see tradeoff in AdX RTB buyer revenue
- Are we OK if we don't ramp up full 25% by end of month?
  - ○ As long as we ramp up to 5% by end of month, we shouldn't have to worry about them taking back resources

- ○ ████ : double check email to make sure
- Experiment currently at 0.1% for training pool for tDRS
  - ○ Want to ramp up to 1%, should we also implement debt recollection for this

Meeting: DRS Sync
Date: 9/18/17
Agenda

- DRS ramp-up
- DRS training on low-floor
- Lower revshare for AMP
- DRS opt-out rollout

Action Items

Notes

- DRS ramp-up
  - ○ Goal is to make DRS incentive compatible from a publisher perspective
  - ○ Plan to ramp tDRS to 25% and leave DRS v2 on for remaining 75%
- Legal sync with Tim
  - ○

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  - ○ Difference in revenue between DRS v2 and tDRS on AdX buyers is upper bounded ████
    █ ████████████████
- DRS training on low-floor
  - ○ Low floor experiment - 1% experiment for training
    - ■ Aren't currently using for training
    - ■ Want to see how model performance differs when training on 1% experiment

Meeting: DRS Sync
Date: 9/11/17
Agenda
Action Items

- ████ : ramp up debt recouping experiment
- ████ ████████████████
  ████████████
- ████ : let's pick a number for how comfortable we are losing Google profit -- roll tDRS out to whatever percentage we can to still hit that number

Notes

- Rasta experiment w/ debt recollection
  - ○ About the same increase in revenue
  - ○ Less loss in Google profit

- - RPI decrease - match more Adwords impressions, which are cheaper
- ███
- ████████: ramp up debt recouping experiment
  - To determine what rev share to take when RPO sets floor, we do simulated auction without RPO and can take up to incremental amount provided by RPO in additional rev share
- We don't recoup all debt with DRS v2 and with tDRS
  - With DRS v2 we lose ██████████████ in pub debt (very small)
  - Based off linear extrapolation, we would expect lost debt in tDRS to be about 10x (but b/c the pool size is so small for 0.1% experiment we expect this to increase less than linearly)
- We should emphasize more strongly that this is a launch that's good for publishers despite interaction effects w/ Bernanke
- AdX buyers are doing worse with tDRS vs. DRS v2 b/c tDRS is enabled for all buyers + b/c tDRS is weaker (have to make ML prediction before seeing bids)
- ██ ██████████████████████
- 4 proposals
  - Symmetric
  - Asymmetric (DBM + GDN tDRS, AdX - v2)
  - DBM - tDRS, AdX - v2
  - DBM & AdX - tDRS
- ████████: let's pick a number for how comfortable we are losing Google profit -- roll tDRS out to whatever percentage we can to still hit that number
- We should run joint experiments with tDRS + RPO going forward

Meeting: DRS Sync
Date: 8/21/17
Agenda
- Experiment results
Notes
- 2 0.1% experiments since last Friday (Rasta results vs. no DRS, rasta results vs. DRS v2)
  - Experiments arm 1: Top 100 buyers
  - Experiments arm 2: Top 50 buyers
  - Control is current production behavior
- DBM: ████████████████████████████████████
  - Could imply that our DBM model is less accurate
  - Need to ramp up to 1% to get more accurate data
    - Ramping both to 1% might not be viable from a resources perspective (qps)
  - ██
  - We will need to do core estimation once we ramp up
    - Will need to justify revenue vs. core tradeoff

- Should we start to think about how to reduce number of cores used?
  - We could just apply model to branded queries
  - We should focus first on revenue, improving model, and then we can think about revenue vs. core tradeoff
- Decision: proceed to 1% for top 100 buyers; get resource estimate for 10% experiment
  - Goal for end of quarter is to be at 25% with an experiment
- Experiment results don't differ materially from training model
  - ▇ is planning to match if model performance in serving matches training performance (will do after we go to 1%)
- How do we want to throttle for tDRS?
  - Let's implement debt reclamation and see how we are doing first
  - Let's focus on throttling if we can't reclaim debt well enough
- We may want to have a knob to smooth debt reclamation over time
- No buyer bank account needed
- ▇ - set up to monitor amount of debt in bank account over time
- Need a controlled Bernanke experiment to get accurate ramp up results on Adwords (will need this for GDN launch review)

Meeting: DRS Sync
Date: 7/31/17
Agenda
- live experiments blockers
- pre-paid plans
- recover default opt-out
- native negative DRS

Action Items
- ▇: Ask if Adwords / DBM can change setting for external exchanges to disable for sellside dynamic rev share

Notes
- Flag flip should go live on Wednesday for tDRS experiment
  - Should disable DRS v2 in experiments
- Maybe we just do future RPO launches for DRS opted in pubs
  - ▇ bring this up at RPO weekly (e.g. for selective aggregation)
- ▇ publishers created between Sept 2016 and July 2017
  - Opted out by default when account was created
  - Planning to change setting in the UI next week, giving pubs in product notification, and enforcing setting in UI starting 4 weeks after that
- DRS negative rev share for native
  - A few small code updates needed before launch
  - Sunset in a year
  - tDRS can have flexibility to going to negative rev share for native
- AMP negative rev share DRS
  - Can engage the AMP team to see if this makes sense

- ███████ Ask if Adwords / DBM can change setting for external exchanges to disable for sellside dynamic rev share

Meeting: DRS Sync
Date: 7/31/17
Agenda
  - live experiments blockers
  - pre-paid plans
  - recover default opt-out
  - native negative DRS
Action Items
  -
Notes
  - Live experiment blockers
    - CL has been in review for a few days on hooking up prediction module
      - ████████████████████████████, this CL should be live in ~1 week
    - Need to look at Cat2 production flags in our setup for global test
    - Override publisher revshare test in global test will be submitted today
    - Aiming to start live experiments next week
    - SRE in MTV working on setting up monitoring right now
  - Pre-paid plans
    - Why not just do negative rev share DRS?
      - Harder to sell internally, esp. with buyside
        - Currently neg rev share has sunset deadline
      - Buyer has to opt in, gives us more flexibility
        - Don't want to risk our margin, allows us to be more aggressive
        - Easier to go negative rev share
    - Why not combine debt pools btwn prepaid plans and DRS?
      - One debt pool: larger pool, don't have to maintain separate accounting
    - How does tDRS interact with prepaid plans?
      - For considering an example as positive / negative, consider the counterfactual where prepaid plan does not exist
    - We need to decide preference for whether to use prepaid plan or our margin to fulfill queries
  -

Meeting: DRS Sync
Date: 7/24/17
Agenda
Notes
  - Clientside model
    - ██████████████████████████ ■ ███████████████
      ███████████

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- ▪ ██
  ████
  - ▪ Set back of ~1 week for live experiments
  - ○ Need to submit CL and wait for Supermixer release
  - ○ Hoping to have binary in testing cell in next couple of weeks
- SRE
  - ○ New SRE is going to working on monitoring
  - ○ Thanos set up a biweekly meeting
- Currently doing implementation work to make sure we don't enforce tDRS model on external changes
- Testing side
  - ○ SMARTASS model server setup for testing
- Pub revshare override flag -- need to write one more test to make sure RPO reserve not affected
- Working on logging CL to log reserve revshare
- Should be able to start live experiments in 1-2 weeks

Meeting: DRS Sync
Date: 7/17/17
Notes

- Prediction module and servers
  - ○ Models were now unstuck and loaded into all data centers, up and running.
  - ○ Pushed model: max_threshold
  - ○ TODO(████): Finalize the model name.
  - ○ Client-side codes are close and should be done this week, will test locally and then one DC.
- Testing / Monitoring
  - ○ Worked on CL to ping predictions, will patch producer CLs.
  - ○ Logging: will log value from prediction models, as well applied reserve revshare.
  - ○ TODO(███ Implement reserve revshare logging.
  - ○ Feature skew: need to follow up later to log sampled features.
  - ○ Global test: adding test override test case.
  - ○ TODO(█████ Test locally on Stubby to production model serves. Test cell: TG MDB ad-supermixer-testing.
  - ○ TODO(█████ Add test tDRS model for unit tests.
  - ○ TODO(█████ Bring up model servers up in the globaltest.
  - ○ TODO(█████ Set up monitoring for model reservers.
  - ○ TODO(█████ Design monitoring streamz on the client client for model predictions.
  - ○ Live experiments expected in 2 more weeks.
- Opt-out status for external exchanges
  - ○ Some external exchanges are enabled for dynamic revshare.
  - ○ This is no-op since we disallow external exchanges in the serving.

- o ████████████████████████████. External exchanges are still treated as adx publishers.
- o ~~TODO(████ Follow up with Awbid and DBM team to disable DRS in the database.~~
- o TODO(████ Add a guard against external exchanges for tDRS.

Meeting: DRS Sync
Date: 7/10/17
Notes

- Models have been loaded in one cell
  - o Expectation was that they'd be loaded and running in all cells
- We need logging change to log performance stats for prediction modules
  - o ████████████████████
  - o Could we sample to get performance stats w/ less storage in qsem needed?
  - o We should file a ticket for additional storage
    - ■ Expectation is that this will take ~1 day
  - o Plan to measure backend latency + cpu
- Need global test + test cluster enabled before live experiments
- Will we run into the same issues with tDRS + Bernanke as Bernanke + RPO?
  - o Worry is that we'll see margin loss on GDN impressions (b/c we'll be causing transactions where Bernanke was working hard but just barely didn't clear to clear w/ tDRS)
  - o We'll ask GDN to run custom Bernanke pool for our experiment
- Need to sync with pub index team + cat2 auction teams

Meeting: DRS Sync
Date: 6/26/17
Agenda

- Model servers
- DRS + RPO decouple launch
- third-party min launch
- Native negative rev share DRS

Action Items

- AI(████ Get ████████s sign off for DRS + RPO decouple launch; ping ████
- AI(████ set up meeting to sync with ████ for third-party min launch

Notes

- Model servers are up in test
  - o Got extra resources for prod
  - o ████████████████████
    - ■ ████████████████████████
    - ■ ████████████████████████████
  - o ████████████████████████████████
    ████████████████████
  - o What we want to do

- ▪ ████████████████████████
- ▮ ██████████████████████████
- Will be close to code complete by end of week
  - ○ Will still need to write tests
- DRS + RPO decouple launch
  - ○ Will try to launch this tomorrow
  - ○ **AI(**████**)** Get ███ ████████ sign off for this; ping ██████
- **AI(**██████**)** set up meeting to sync with ██████ for third-party min launch
- For native negative rev share DRS, estimate coding clean up time needed; decide whether to do before or after launch

Meeting: DRS Sync
Date: 6/19/17
Agenda
- Around the room

Action Items
- **AI(**███**)** ███████████████████████████████████e
- **AI(**███**)** ████████████████████████████████████ ████████████
- **AI(**███ | ████**)** talk about general feature validation solution we could use across Ads Quality models

Notes
- Servers are currently crashlooping
  - ○ Hoping to have servers up to test tomorrow
- We have two predictions per ad slot for tDRS
  - ○ ████████████████████████████████████ ███████████████████████
  - ○ ████████████████████████████████████
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    - ▮ ██████
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- Goal is to be code complete by end of Q2
- ████████████████████████████████████
    - ▮ ██████████████████████
    - ▮ ████████████████████████████████████
    - ▮ ████████████████
- ██████ + ████ discussing how to determine if features are aligned between serving + training
  - ○ AI(████ / ████) talk about general feature validation solution we could use across Ads Quality models
- ██████ has started working on dept recouping mechanism for tDRS

     ○ Fake candidate in TYM chain is used to implement Jedi last look, truthfulness

Meeting: DRS Sync
Date: 6/12/17
Agenda
- modelservers onboarding
- prediction module
- negative DRS for AMP
- third-party filtering before auction change

Action Items
- AI(█████ ████ Follow up with SREs to help unblock process
- AI(███████ ██████ █████ think about testing plan for tDRS
- AI(████████ ███ ███████████████████████████████████
- AI(██████ sync with ████ about which candidate to launch for negative rev share for amp
- AI(███████ run simulator to try to find discrepancy w/ third-party filtering before auction change

Notes
- Model servers onboarding
  - SRE is now on board with what we are doing
  - We've written prod plan for them
  - What we need from them
    - Onboarding documents to help with setup
    - Someone to help with server issues when its in production
  - We'll need to verify that usernames / MDB groups work as intended
  - AI(█████ ████ Follow up with SREs to help unblock process
- Prediction module
  - We'll need to test the model once it is in production
  - Expecting ~2 weeks of coding, followed by testing
  - AI(███████ ███ █████ think about testing plan for tDRS
- Modeling
  - ████████████
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    - █████████
    - ██████████████████████████████████
- Negative rev share for AMP
  - Short-term experiment using DRS v2 logic
  - AI(██████ sync with ████ about which candidate to launch for negative rev share for amp
    - Option 2: create a shared DRS debt pool across native and non-native inventory so that non-native inventory can subsidize native inventory

- third-party filtering before auction change
  - AI(███████ run simulator to try to find discrepancy w/ third-party filtering before auction change
- Decouple DRS + RPO launch
  - Is there anything we should worry about?
    - Don't think it is large enough for impact to be noticeable

Meeting: DRS Sync
Date: 5/22/17
Agenda
- Around the room

Action Items
- AI(██████ talk to ████████████ about if we need to give lead time before making serving change
- TODO██ Slice presented results from meeting by buyer
- TODO██ Train second stage of model on set of queries where first stage says to set rev share < 20%

Notes
- 3 components for model implementation / serving work (████████
  - Writing code for producer
    - Following up with reviewers over ping
  - Auxiliary producer for per buyer CPMs
  - ████████████████████████
    - ██
      ████████████
    - Following up with SREs to make decision
- Looking into if we can apply third party min to each candidate in TYM chain (████████
  - Looking to make decision soon (get approval from ██████
  - AI(██████ talk to ████████████ about if we need to give lead time before making serving change
- Model trained on 1% of queries yields approximately the same results as training on 10% of queries
- ██ has started working on a two-staged model
  - ██ ██ ███
    ████████████████
  - ██ ██ █
    ████████████████
  - ████████████████████████████████
  - TODO██ Slice presented results from meeting by buyer
  - TODO██ Train second stage of model on set of queries where first stage says to set rev share < 20%

Meeting: DRS Sync
Date: 5/8/17

Agenda
- prediction module
- floor lowering experiments
- RPO recoupment

Action Items
- **AI(**███**)** run experiment to see how we do if we train on 1% of data
- **AI(**█████**)** follow up with ████
- **AI(**█████**)** look into HC article for TYM to see if we say we apply third party min per element or per chain

Notes
- Floor lowering experiments
  - Change for experiment needs to wait for Supermixer
  - ████████████████████████████████████
  - Right now we are training on 10% of data
  - **AI(**███**)** run experiment to see how we do if we train on 1% of data
  - We could vary percentage by buyer if needed
- RPO recoupment
  - Corner case for how we do filtering in tDRS right now
    - Proposal is to pass list of CPM thresholds, rather than just highest
  - Need to handle RPO reserve vs. pub reserve differently in tDRS
  - After this change, we should be able to prove truthfulness for each buyer
  - RPO recoupment
    - ████████ has proposal for how to apply reserve price to chains to simplify things
- Third party min
  - ██
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  - Benefit is simplification of tDRS logic
  - **AI(**█████**)** follow up with ████
  - ████████████████ ██ ██ █████████████████████████
    ████████████████████████
    - **AI(**██████**)** look into HC article for TYM to see if we say we apply third party min per element or per chain
- Live experiment timeline
  - End of quarter is projection

Meeting: DRS Sync
Date: 5/1/17
Action Items
Notes
- Feedback from Supermixer team

- ○ Where should we put revenue share decisions?
  - ▪ ███████████████
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    ███████████
  - ▪ ███████████████████
    ███████
- ○ In order to let DBM see lowered reserve price
  - ▪ Option 1: whenever DBM use pricing rules, make sure they don't look at pre rev share amount
  - ▪ ████ long-term approach should be that we tell DBM correct floor (max of all floor, same reserve price we tell RTB)
  - ▪ Issue: floor we tell DBM not really same as RTB b/c they read from AdX rules
  - ▪ Short-term: as long as we enforce floor correctly that should be fine (never clear bids below truthful floors)
  - ▪ Suboptimal: DBM makes decision about whether to bid branded or anonymous, might make wrong decision if they don't have right floors
- Recoup from RPO
  - ○ Bank account logic for DRS v2:
    - ▪ Price > bid: accumulate debt
    - ▪ Price < bid: pay back debt
  - ○ Stateful option in simulator for DRS
  - ○ ████ suggests running experiment where we just recoup when RPO sets floor vs. when any source sets floor
- Decision for tDRS training
  - ○ Go with option of sending out r (pub reserve) and enforcing r for 1% experiment

Meeting: DRS Sync
Date: 4/24/17
Action Items
- AI(████) follow up on options with ██████████

Notes
- Options for tDRS training data experiment
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- Where should we recoup pub debt?
  - ○ Options
    - ▪ Second price support from another bid

- ■ RPO price
  - ○ Want to try both options to see difference in lift
- Want to avoid being profit negative
- Goal is to set up a live experiment and then tune model (e.g. drop rev share to 10%)
- Overall goal: want publishers to get larger payout with tDRS on than tDRS off, considering value CPMs as true opportunity costs
- Pub side only debt recouping
- Could develop a controller instead of offline pipeline to tradeoff how much debt we let pubs build up based on how large our opportunity is to recoup debt
- Could move to three levels (0%, 10%, 20%) - might double model size, which increases cost
  - ○ Need to be able to justify cost with simulation results

Meeting: DRS Sync
Date: 4/20/17
Agenda
- Serving design

Action Items
- **AI(**　　**)** Ask 　　　　 about running 1% experiment to see buyer bids in response to lower reserve price
- ~~**AI(**　　**) create tDRS ariane entry for 1%; will add another stage for subsequent ramp ups~~ https://ariane.googleplex.com/launch/189140

Notes
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- Only small percentage of buyers don't bid below floor
  - ○ With tDRS, this may change
  - ○ **AI(**　　**)** Ask 　　 / 　　 about running 1% experiment to see buyer bids in response to lower reserve price
    - ▪ Reveal no reserve price, reveal in post rev share space reserve price
- Expect to run 1% experiment for tDRS this quarter
  - ○ Expect to run experiment with debt recouping when RPO sets floor
- Current simulation shows ███ hit in profit -- need to see how much we can recoup from RPO

- ○ If we can't recoup full profit on RPO, we'll launch tDRS on percent of traffic
- We can tune confidence threshold for how confident we need to be before lowering rev share to 0%
- ███
- How many ariane entries do we want?
  - ○ **AI(**████**)** create tDRS ariane entry for 1%; will add another stage for subsequent ramp ups
- Planning to start working on debt recouping mechanism
- go/tdr-tasks to track work towards tDRS
- Want to move to flogs in the long run; need to wait until they also have unmatched queries
- ●

Meeting: DRS
Date: 4/10/17
Agenda
- Per-buyer reserve prices
- Dynamic discretization
- RPO coverage

Notes
- Per-buyer reserve prices
  - ○ After logging per-buyer reserve prices, the model performed similarly on training and testing (simulation) data. ██████████████████████ ██ ████████████████████
  - ○ Simulations after per-buyer reserve prices
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- Dynamic discretization
  - ○ ██
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  - ○ TODO(████) Compare performance and model size on these options.
- RPO coverage
  - ○ ████████████████████████.
  - ○ TODO(████) weight the coverage by revenue.

- If that coverage's good we can simulate RPO-based approach for tDRS.
- Serving design docs
  - TODO(team): Review and comment on the serving design doc.
  - █████████████████████████████████
    ████████████████████████.
- Combine DRS v2 and tDRS
  - There're several possibilities, such as use tDRS to set the floor while use DRS v2 to recoup.
  - Will be discussed more in f2f

Meeting: DRS
Date: 4/5/17
Agenda
- Discuss combining tDRS designs
Action Items
- **AI(**██████**)** question on what coverage is of all bids RPO (how often do we have a reserve price that we could use for calculations)
Notes
- Combining tDRS designs (deck)
  - Next step for tDRS: Could do prediction between 0, 10, and 20% rev share
  - With tDRS recollect when RPO price sets floor
  - All bids RPO
    - All bids RPO: trains on winning and losing bids
    - **AI(**██████**)** question on what coverage is of all bids RPO (how often do we have a reserve price that we could use for calculations)
    - We don't have any RPO prices for Adwords currently
  - Per-pub revshare parameter
    - Makes sense to joint optimize with current tDRS model
    - We could also think about computing mu per bucket instead of per pub
      - Tradeoff between noise vs. specificity
  -

Meeting: DRS Sync
Date: 4/4/17
Agenda
- Negative rev share for strategic areas (mobile, amp, app, video, etc)
- Production module for tDRS
- tDRS model updates
Action Items
- AI(██████) figure out how many serving instances you'd need to cover 0.1% of traffic (to better estimate core needs for tDRS)
Notes
- Negative rev share DRS
  - Concerns with doing negative rev share DRS on too broad of a set of inventory

- ○ Next area that makes sense is probably AMP
- Production module
  - ○ Met with Supermixer team
  - ○ Addressed all AIs, shouldn't need additional meetings with Supermixer
  - ○ Thanos just needs to finalize doc and get final approval from Supermixer team
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- Per buyer reserve was pushed to production last Monday
  - ○ Pulled into training pipeline
  - ○ Simulation results match Sybil results now
- Started using branded type as feature in model
  - ○ 3rd most important feature in template explorer now
  - ○ ███████████████████████████████████████
    ██
- Hard constraint to send out correct reserve price to buyers
- Viewability was feature in tDRS model
  - ○ ████████████████████████████████████
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        ▌ ██████████████████████████████████████
- ██████ model (dynamically adjusting reserve price in dynamic region)
  - ○ Does worse in terms of match rate + profit compared to tDRS

Meeting: DRS Sync
Date: 3/27/17
Agenda
- Opt-out pub dashboard and alerts
- per-candidate reserve logging
- prediction module and SRE review
- ██████ simulation script

Notes
- Opt-out pub dashboard and alerts
  - ○ We can't run experiment for DRS for publishers that opt out
  - ○ We know percentage wise how many impressions
  - ○ **AI(**████**** ping **██** to get further explanation

Redacted - Privilege

- prediction module and SRE review
  - ██████████████████████
  - ██████████████████████
  - Once design doc is in good state, ██████ planning on doing review
- ██████ simulation script
  - ███ has run ██████ simulation script, still needs time to tune parameters
  - ██████ simulation suggests pub rev share to use for ad request to be sent out
- Negative rev share for native
  - Figured out way to do cross subsidization across native and non-native w/o code change
  - Still looks like we are losing a significant amount of profit even with shared pool
    - 0.1% experiment - could be the small size of the experiment that is keeping us from recouping
      - Ramping up could alleviate this issue
    - One potential issue is that some native buyers might not have significant fraction of
      - AI(████ look up top native buyers and see what their spend looks like outside of native inventory
- Other strategic areas we could run DRS experiment for
  - AMP
    - Could do mobile overall
  - Video

Meeting: DRS Sync
Date: 3/20/17
Agenda
- tDRS Modeling
- Prediction module
- tDRS - in expectation
- Opt-out pubs

Action Items
- AI(████ Re-run simulations after training/serving skew on per-candidate reserve prices is fixed.
- AI(██████ Follow up with SRE team on SRE review
- AI(████ Follow with ████ and run simulations with ██████ modifiers and compare with existing prediction-based approach.
- AI(████████ Measure the percentage of opt-out traffic. AI(████████ Measure the rev lift due to DRS on the opt-out pubs.

Notes
- tDRS Modeling

- ○ ██ has found that in the eval time we did not get the reserve price floors correctly for losers in the auction. This negatively impacted the predicted performance as we had been observed.
- ○ We also did not get the correct reserve prices for losing candidates in the training time. The reserve price is the minimum among floors.
- ○ ██ will address these issues by logging the correct reserve prices for both winning and losing candidates, and use them correctly in the training / eval.
- ○ AI ██ Re-run simulations after training/serving skew on per-candidate reserve prices is fixed.
- ○ Adding a new feature - branding type.
- **Prediction module**
  - ○ ██.
  - ○ For buyers we will start with top K buyers with most spend.
  - ○ ██████████████████████████████████████ ████
  - ○ ██████████████████████████████████████ ████████
  - ○ AI ██ Follow up with SRE team on SRE review
- **tDRS - ██ simulation on variants**
  - ○ The policy of setting reserve price is a fixed point learned from previous days, subject different revshare policy and recoupment.
  - ○ The recoupment policy without considering publishers' outside options is likely to get pushed back by publishers.
  - ○ AI ██ Follow with ██ and run simulations with ██ modifiers and compare with existing prediction-based approach.
- **Opt-out pubs**
  - ○ ┊ **Redacted - Privilege** ┊
  - ○ To make dashboard useful for gauging opt-out impact and monitoring, we can
    - ■ TODO ██ Measure the percentage of opt-out traffic. We wouldn't know fore sure the rev lift from these opt-out pubs, but the magnitude of opt-out traffic gives us some idea on the magnitude of opt-out impact.
    - ■ TODO ██ Measure the rev lift due to DRS on the opt-out pubs. We would expect no rev diff on the opt-out pubs. If we observe significant diff the opt-out mechanism is broken and we should get an alert.
  - ○ Nitish brought up that we should consider offering "opt-in", instead of "opt-out". When a publisher opts out of an optimization, we can no long run experiments on them. However, when a publisher does not opt in an optimization, we can STILL run experiments on them.

Meeting: DRS Sync
Date: 3/8/17
Agenda

- tDRS pricing
- model eval on training and testing
- prediction module serving flow
- negative DRS on native

Action Items

- **AI** ▮▮▮ ██████████████████████████████████████ ████████████████
- **AI** ▮▮▮ check if there is a split between winning / losing bids in terms of which have reserve price listed

Notes

- Resolved issues
  - Issue with not filtering out non-AdX publishers in Sybil pipeline fixed now
  - Added fix to send per buyer reserve prices
- Testing data seems to be different than training data (analysis)
  - ████████████████████████████████ ██████████████
- ▮▮ analysis
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- Currently in AdX simulator, using highest bid (not necessarily same as winning bid)
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  - ▮ ██████████████████████████
  - ▮ ██████████████████████
  - **AI** ▮▮▮ check if there is a split between winning / losing bids in terms of which have reserve price listed
- ▮▮ ▮▮ there is also human readable output for simulation results
- prediction module serving flow
  - Still waiting for Ads SRE to review proposal
  - Meet every two weeks to review proposals
  - Goal for quarter: finalize design for Supermixer

Meeting: DRS Sync
Date: 2/27/17
Agenda

- tDRS simulations
- Prediction checking
- adx auction in post-revshare

Action Items

- **AI** ▮▮▮ / ▮▮ Look at precision / recall numbers from simulation results off of forecasting logs

- AI(███) follow up with SREs about Supermixer setup for tDRS
- AI(███) would be good to test ███ model within AdX simulator
- AI(███) start 1% experiment of ICM + post rev share launch

Notes
- Updated simulation to charge buyer reserve price (w/o margin), as opposed to pseudo first price (simulation results)
- Using per buyer reserve price improves tDRS performance
- Numbers look reasonable
  - ██████████████████████████
  - ████████████████████████████y
- Results are without recouping
  - We can recover profit through debt recouping mechanism potentially
- Slicing on lantern shows reasonable precision / recall
  - AI(███ / ███) Look at precision / recall numbers from simulation results off of forecasting logs
- Blockers for running a tDRS experiment in production
  - Prediction modules + server setup needed for tDRS in Supermixer
    - Setup steps
      - Write code
      - Set up server
      - Get approvals from Ads SREs and Supermixer team
        - This is where the unknown aspect of the timeline exists
          - AI(███) follow up with SREs
- ██████████████████████████
- ███ has built model that could potentially be combined with tDRS
  - Has own simulator for testing model
  - Computing multipliers per publisher to try on top of reserve prices
  - AI(███) would be good to test ███ model within AdX simulator
- Post rev share launch
  - Negative revenue change (esp for DFL)
  - Want to couple with positive rev launch (ICM)
  - Will launch two together this week
  - AI(███) start 1% experiment of ICM + post rev share launch
    - Want to ramp these up at same time -- will want to implement in same layer

Meeting: DRS Sync
Date: 2/22/17
Agenda
- tDRS model checking - lantern and more
- Target CPM

Action Items
- AI(███) look into why we see examples for non is_adx_pubs

Notes

- tDRS model checking - lantern and more ([doc](#))
- **AI(**█**)** look into why we see examples for non is_adx_pubs
- Target CPM ([PRD](#))

Meeting: DRS Sync
Date: 2/13/17
Agenda
- DRS opt-out PM
- tDRS model error analysis
- prediction call
- target cpm

Action Items
- **AI(**█**)** get feedback from █ follow up with account teams for █ + █
- **AI(**█ **/** █**)** look into negative profit from simulation of GDN won queries in production setup
- **AI(**█ **/** █**)** sync on investigating tDRS model accuracy

Notes
- DRS opt-out PM ([doc](#))
  - Working on post mortem
  - Time of impact: Dec 7 - Feb 7
  - Summary of problem
    - Pub can opt out of DRS in UI
    - We store setting and it gets propagated to Supermixer
    - Opt outs sat behind a flag, we never enabled flag to enforce opt outs
  - Proposed changes
    - Good to create test around what we see in production
      - All of our current tests condition on the flag value (opt in vs. opt out)
    - Dashboard monitoring
    - Add more process during reviews (remind you to flip flag)
    - Different warning message for launch experiments expiring
  - **AI(**█**)** get feedback from █ follow up with account teams for █ + █
- tDRS model error analysis ([doc](#))
  - Query Sample logs: buyer network id 0 can mean
    - No one bid on query
    - Buyer network id 0 also could be used for Gmob mediation (separate field to indicate this)
      - Don't need to worry about including these cases in training b/c we don't apply DRS to Gmob mediation
  - █
  - Weight: average reserve price
  - False / true: whether or not bid is above the pre-revshare reserve

- ○ **AI(**████ **/** ████**)** look into negative profit from simulation of GDN won queries in production setup
  - ■ Can slice by transaction type (open auction vs. private auction) to decouple from GDN leaving PAs
  - ■ Can slice by floor type (pub floor vs. RPO floor) to see if we have differential performance
- ○ Simulation currently includes RPO prices
- ○ **AI(**████ **/** ████**)** sync on investigating tDRS model accuracy
- Prediction call
  - ○ Serving office hours next week
  - ○ Decent progress on serving progress for tDRS
- Target CPM ([PRD](PRD))

Meeting: DRS Sync
Date: 2/6/17
Agenda
- tDRS sim error analysis
- DRS opt-out
- prediction RPC

Action Items
- **AI(**████**)** check coverage of IU
- **AI(**████**)** good to measure accuracy in simulation (for apples to apples comparison to modeling)
- **AI(**████ ████**)** parent - look into this from DRX pipes to see if opt outs are from same company; look into change list for setting (ask ████ look into AM of pubs
- **AI(**████**)** create bug to track revenue lift on DRS opted out pubs
- **AI(**████**)** invite ████ to DRS sync
- **AI(**████**)** need to trigger tDRS even for third-party reserve prices

Notes
- tDRS sim error analysis
  - ○ Simulation seg-faulting -- debugging current simulation logic
  - ○ Updated model (previously 2 months old)
  - ○ ████████████████████████████████████
    ████████████████████
    - ■ **AI(**████**)** check coverage of IU
  - ○ ████████████
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  - ○ ████ suspects disconnect between model + simulation - might be good to measure accuracy in simulation (for apples to apples comparison to modeling)

- - ■ AI(▮▮▮) good to measure accuracy in simulation (for apples to apples comparison to modeling)
  - Opt out
    - ○ **AI(**▮▮▮ ▮▮▮**)** parent - look into this from DRX pipes to see if opt outs are from same company; look into change list for setting (ask ▮▮▮ look into AM of pubs
    - ○ **AI(**▮▮▮**)** create bug to track revenue lift on DRS opted out pubs
  - Prediction RPC
    - ○ **AI(**▮▮▮**)** invite ▮▮▮ to DRS sync
    - ○ Need to get buy in for super mixer
  - **AI(**▮▮▮**)** need to trigger tDRS even for third-party reserve prices

Meeting: DRS Sync
Date: 1/23/17
Agenda
- DFL DRS bug fix plan
- Native DRS
- tDRS sim
- DRS dashboard and opt-outs

Action Items
- **AI(**▮▮▮**)** look into impact of going with DFL-specific RPO (▮▮▮▮▮▮▮▮▮▮▮▮)
- **AI(**▮▮▮**)** schedule follow up meeting to talk about simulation + dashboard in follow up meeting

Notes
- Renato found DRS / DFL bug (deck)
  - ○ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮
  - ○ Basically DRS negative rev share (can still clear down to original publisher reserve) but without publisher debt
  - ○ Options
    - ■ Roll out fix right away
      - no impact on match rates
      - ▮▮▮▮▮▮▮▮▮▮▮▮▮▮
      - ▮▮▮▮▮▮▮▮▮▮▮▮▮▮
    - ■ Roll out fix gradually
    - ■ Couple fix roll-out with DFL-specific RPO to reduce rev drop
      - Could run quick experiment to measure this effect
      - **AI(**▮▮▮**)** look into impact of going with this approach
  - ○ ▮▮▮ why didn't GDN notice
    - ■ ▮▮▮ They do neg rev share (10 - 15%) on remarketing queries; hard to separate out the two effects
- Native DRS (rasta)
  - ○ Launch target is AdX buyer
  - ○ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮

- ○ Recollect only on native pool for this experiment
- ○ RPI increases for all threshold values
- ○ Launch one of these candidates
- **AI(**███**)** schedule follow up meeting to talk about simulation + dashboard in follow up meeting

Meeting: DRS Sync
Date: 1/9/17
Agenda
- tDRS training pipeline
- tDRS simulation
- Decouple RPO and DRS
- DBM throttles bids below floor
- Flip adx auction ranking to post-revshare

Action Items
- **TODO(**██**)** run next day evaluations to see results for tDRS model on next day data
- **TODO(**██**)** look at revenue-weighted version of buyer self-censorship metrics
- **TODO(**██**)** look at just AdX buyer slice for comparing control_no_drs, control_with_drs, and treatment_tdrs
- **TODO(**██**)** create experiment group for always giving up margin
- **AI(Quality team):** talk with research about their OKRs for tDRS

Notes
- Training pipeline changes
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- tDRS simulation
  - ○ █████████████████

- ○ **TODO** ██ run next day evaluations to see results for tDRS model on next day data
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- Decouple DRS + RPO
  - ○ Starting experiment today
  - ○ Don't expect huge impact
  - ○ If small, we should start prepping for launch
- Throttle DBM bids before floor
  - ○ Plan to do in Q1
- ██████ plan to run auction ranking in post-rev share space
- **AI(Quality team):** talk with research about their OKRs for tDRS
- tDRS v1 will have bank account mechanism
  - ○ Even if we don't change price, need to be able to get payback from RPO

Meeting: DRS Sync
Date: 12/12/16
Action Items
- **AI(** ██████ sync with ███ to see if sending low reserve price is OK
- **AI(** ██████ look into how often RPO clears b/c of DRS

Notes
- ███ feedback from tDRS implementation meeting
  - ○ ███████████ → ██████████
    - ▪ █████████████████████
    - ▪ ██████████████████
    - ▪ █████████████████████
  - ○ Restrict to just AdX pubs
  - ○ ████████████████
    - ▪ ████████████████
  - ○ Looking into small percentage experiment where we send low reserve price but still enforce higher reserve price
    - ▪ Gather data for tDRS training (for buyers that never bid below reserve)
    - ▪ Buyer will still see rejection reason that bid is below reserve price

- ▪ AI(█████ sync with ██ to see if this is OK
  - ○ ██████ ███████████████████████
    - ▪ █████████████
- ████ reduced holdback for DRS to 5% from 10%
  - ○ Impact is similar on matched queries + revenue
  - ○ ████████████████████
- Danny started logging "cleared_with_increased_pub_revshare"
  - ○ Logged for entire query but not per ad in TYM chain
  - ○ ██
    ████
- Discuss disabling DRS on RPO queries
  - ○ Needed to be per query truthful
  - ○ Needed before tDRS training
  - ○ AI(████████ look into how often RPO clears b/c of DRS
    - ▪ ███████████████████████████████████

Meeting: DRS Sync
Date: 11/14/16
Notes

- ██ and ██ will be working on bid oblivious DRS
- DRS v2 launch plan
  - ○ ██████ will launch revealing third-party min today or Tomorrow
  - ○ DBM exemption at 35% → go to 100% by Thursday
  - ○ Will still be able to get DRS v2 in before Thanksgiving
- Negative rev share for native
  - ○ Version where we only apply DRS above some threshold -- will be able to get results from experiment by early December

Meeting: DRS Sync
Date: 11/7/16
Notes

- ████ discovered issue where Jedi buyers are not being properly exempted from third-party min
  - ○ ████████████████████████████
  - ○ ████ submitted change that should go out in release later this week
- Real-time feedback for buyers - some cases where buyers get charged more than their bid
  - ○ Seems to be exacerbated by DRS
- Might push launch of DRS v2 into December
- Native negative rev share
  - ○ Experimented with different negative rev share thresholds for native
    - ▪ Cause CPMs to drop
      - • Plan to run experiment where we only apply DRS negative rev share when bid is higher than average CPM from control group

- o   Other strategic areas: mobile app, mobile web

Meeting: DRS Sync
Date: 10/31/16
Agenda
- DRS v2 launch plan
- DRS goals for Seuss

Notes
- ████ still needs to confirm that third-party min isn't revealed to Jedi buyers
  - o   **AI(**████**)** Sync with ████
- Currently at 10% for DBM exemption
  - o   Ramp up to 20% (today), 50% (wed / thurs), 100% (next monday / tuesday)
  - o   Try to finish by early next week
  - o   **AI(**████████ ████████████**)**
- Tentatively plan to start ramping up DRS v2 of November 14th
- Still need GDN launch review signoff for DRS v2
- DRS goals for Seuss
  - o   Truthful DRS
    - ▪   Need two versions of RPO - more + less aggressive versions
    - ▪   Need serving change to decide whether to apply dynamic rev share
  - o   Negative rev share (esp. for strategic areas)
  - o   What is launch criteria for truthful DRS on RTB?
    - ▪   ████ should be DRS v2 + powerful RPO vs. truthful DRS w/ powerful RPO

Meeting: DRS Sync
Date: 10/24/16
Notes
- DRS v2 updates
  - o   **AI(**████████**)** ask ████ about work to verify revealing third party min to AdX buyers
  - o   **AI(**████████**)** make sure we have all necessary approvals for reveal third party min to AdX buyers
- Launch freezes
  - o   November 22 - 28 - no ramp ups > 1%
  - o   December 8 - 12 no new experiments but can ramp up existing experiments
  - o   December 12 onwards - no altering experiments
- Truthful DRS
  - o   Launch criteria for truthful DRS: RPO++ and truthful DRS is greater in pub revenue than RPO and DRS v2
    - ▪   Wait to see how much money we lose before making call
  - o   Truthful DRS process
    - ▪   Guess dynamic or not

- ■ Reserve pricing in dynamic region
- ■ Recollect using RPO++ rather than current method
  - Will phase this in (e.g. only require RPO++ to recover 30% of debt at first)
- ○ ▮ has said maybe to a negative rev share approach

Meeting: DRS Sync
Action Items
- ● **AI(**▮**)** be more aggressive on neg rev share with high value queries for native

Notes
- Steps remaining before DRS v2
  - ○ Get Eng approval from GDN for DBM exemption
  - ○ ▮ look at callouts to Jedi to make sure revealing third party min doesn't affect them
  - ○ Hopefully start ramp up week of October 17th (Max will be OOO)
- Planning on running an experiment of DRS neg rev share for native including DBM + GDN
  - ○ If this is successful, we could
    - ■ Ask GDN to make Bernanke more aggressive
    - ■ Or launch neg rev share to all buyers (including GDN and DBM)
- ▮ suggestion: be more aggressive on neg rev share with high value queries for native
- ▮ proposal
  - ○ Calculate RPO' trained on all bids -- if this is less than reserve price, do truthful DRS
- ▮ suggestion: would like to couple truthful with negative rev share in discussions with GDN
  - ○ Nitish: important to show GDN that we are pushing hard on truthful direction
  - ○ "Bid-independent pricing" - better name than truthful DRS
- ▮ working on Sybil model that predict whether bid will be above / below dynamic region ceiling

Meeting: DRS Sync
Action Items
- ● **AI(**▮**)** We should verify that pub rev share for DBM buyers that we exempt from DRS is 80%
- ● **AI(**▮ ▮**)** Set up Ariane entry
- ● **AI(**▮**)** Bit flips for Ariane
- ● **AI(**▮**)** make sure help center updated for DRS v2
- ● **AI(**▮ **and** ▮ ▮**)** talk to jonathan and aparna about neg rev share for priority areas

Notes
- Max: proposal to reduce holdback experiment (▮
  - ○ ▮

- - Holdback is generating alerts as a result of being at ███
    - ██████████████████████████████████
  - DBM exemption status
    - **AI(**████████ We should verify that pub rev share for DBM buyers that we exempt from DRS is 80%
    - **AI(**████ ████ Set up Ariane entry for
    - **AI(**████ Bit flips for Ariane
  - Reveal third-party min status
    - Next week review w/ GDN
  - Overall launch
    - Roughly 2-3 weeks out
  - **AI(**████ make sure help center updated for DRS v2
  - ████ If bidder bids below RPO, what are our thoughts on making this a soft floor and taking 20% rev share
    - Alternative: don't clear query for bids below RPO reserve price
    - Commonality: avoid feedback mechanism between RPO and DRS when they apply at the same time
    - Worry: if RPO becomes too aggressive, DRS could cause us to lose rev share
    - Approach: let's start by looking at data -- simulate both approaches and compare
  - We talked about being more aggressive in video + mobile (neg rev share) and collect debt on desktop
    - **AI(**████ **and** ████ ███ talk to ████ and ████ about this idea

Meeting: DRS Sync
Date: 9/12/16
Action Items
- ████ Add ████████████ meeting to everyone's calendar
- ████ share roadmap for DRS when ready

Notes
- ████ and ████ to meet with ████ AMs and ████ ████ about DRS opt out reasons
  - AI(████ Add calendar entry to everyone's calendar
- V2 launch plan
  - Turn off adx drs for opt out pubs: at 50% now, launch in next couple of days
  - Reveal third-party reserve: early next week launch
  - Changed list for buyer network ids for DBM -- just need to apply
  - Launch drs v2: optimistically start ramp up in a couple of weeks (hopefully before end of september)
- Negative rev share
  - Incremental revenue over DRS v1: roughly 170 million dollars
  - Issues
    - Engineering wise -- not much engineering work
    - Would need GDN launch approval

- What would it take to get GDN's approval?
  - Publisher value -- need to show that publisher value isn't hurt
    - Truthful DRS is solution for this long-term
      - Will get us GDN + DBM
      - Might try to get to truthful incrementally
    - Could only apply negative rev share to price rules + RPO
    - Need to demonstrate value through experiment
      - Would be best if we show difference in publisher value between truthful drs w/ neg rev share vs. non-truthful drs w/ neg rev share so everyone is aware of trade offs
        - Might be necessary for GDN approval
    - Might not be possible to beat full RPO with truthful DRS + RPO
      - Truthful DRS -- ███████████████████
    - Need to make sure there isn't significant cannibalization from opted in DRS pubs with negatvie rev share drs
  - Idea behind truthful DRS
    - We will use future RPO launch to win us back money on truthful DRS
    - Max working on long-term plan for DRS (need for gdn approval)
    - Al█████ share roadmap for DRS when ready
- Subsidizing DFL over holidays could be good for revenue

Meeting: DRS Sync
Date: 9/7/16
Notes

- Gtrade - wants to run experiments with RPO on their native ads
- Video wants us to turn off RPO for video
  - ██
    ████████████████████████
  - ████████████████████████████
  - We could instead turn off RPO for any buyer losing greater than X% of revenue (poor man's iron man)
  - Ideal would be to be able to explain to buyer when RPO is turned on or off
  - ████████████████████████████████ If one buyer is doing poorly but all pubs are doing well, is there an issue?
  - It doesn't seem like there is anything pressing for blacklisting video inventory
- Our optimization for RPO is to try to maximize revenue for each buyer -- when buyer loses money, something is going wrong with RPO
- We could create pipeline to see when prices we set lose us X% of revenue, then turn off RPO
  - Needs to be anonymous (not specific to buyer)
  - ██
    ■ ████████████████████████
- Iron man is long-term solution for this
  - Haven't ironed out threshold to turn off buyer / segment with iron man

- Daily offline pipeline would be easy though
  - Need ariane entry to turn some buyers off
  - Choose threshold, turn off at buyer level
  - ███████████████████████████████
  - Manual stop gap -- iron man could slip beyond a couple of months w/ Q4 as PE quarter
- Set up separate experiment arm for RPO on for non-blacklisted buyers, RPO on for everyone
- Will probably need separate models for blacklisted vs. not blacklisted models
  - Alternatively could train one model and have an experimental flag to blacklist at serving time
- ████ - training on all bids -- making 10K per day for last 8 days
  - Making money through reducing reserve prices + increasing number of buckets (3x number of buckets)
  - More stable reserve price over time (no oscillation)
  - Wants to try 1% experiment for next week
    - ████ try with training on all bids on just inventory or just cookie (suspect cookie will do better on just winning bids)
  - Only looking at distribution bids, not transaction price for losing bids
  - ████ negative rev share DRS when RPO predicts prices lower than publisher reserve
  - ████████████████████
- Meeting to discuss negative rev share
  - Truthful?
  - Cap to negative?

Meeting: DRS Sync
Date: 8/29/16
Attendees: ████ █████████████████████

Action Items

- ████ / ████████████████████████████████
  ███████████████████████
- ████ investigate impact of not applying DRS when DFP line item sets the floor
- ████/████ set up publisher meetings to learn more about DRS opt out reasons

Notes

- Decision reached to reveal third-party min to AdX buyers but not to Jedi buyers at the moment
- Looked over Rasta results from DBM exemption experiments
  - Combination of revealing third-party min, excluding DBM, and launching DRS v2 will appear revenue + profit neutral-to-negative (rasta for excluding DBM and launching DRS v2)

- These launches are necessary to fix incentive problems in DRS v1 (without these launches, we would expect profit and potentially revenue to decrease over time with DRS v1)
- These launches set us up for future launches
  - Negative rev share
  - Bank account across mobile / desktop

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- One of the top reasons publishers have been opting out of DRS is that they feel like it is transferring revenue from other demand sources to AdX
  - Proposals
    - Cosmetic approach: when a DFP line item sets the floor and we apply DRS, always clear at least 5% higher than pub floor -- add the increase in pub payout to pub debt to be recoup on future queries (proposal)
    - When a DFP line item sets the floor and we apply DRS, don't charge the publisher the full debt
    - When a DFP line item sets the floor, don't apply DRS
      - AI▇▇▇▇ investigate impact of not applying DRS when DFP line item sets the floor
  - ▇▇▇▇/▇▇▇ set up publisher meetings to learn more about DRS opt out reasons
- ▇▇▇▇▇▇▇▇▇▇ argument that under certain assumptions (e.g. adx margin is unsustainable) that we should try to make Jedi clearly better than header bidding
  - This might lead to us including third party min to Jedi buyers